

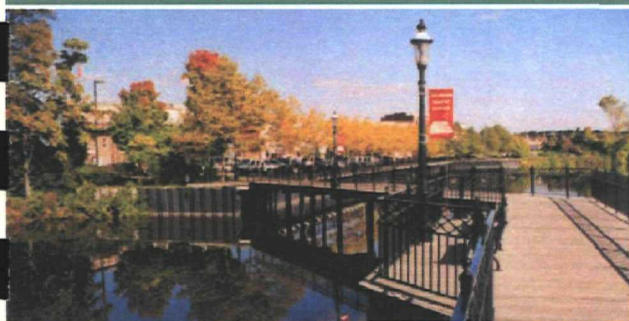


Allied Paper, Inc./Portage
Creek/Kalamazoo River
Superfund Site

Multi-Area Data Management Plan

Kalamazoo River Study Group

June 2008



**Allied Paper, Inc./Portage Creek/
Kalamazoo River Superfund Site**

**Supplemental Remedial Investigations/
Feasibility Studies**

Multi-Area Data Management Plan


Kalamazoo River Study Group

June 2008

ARCADIS



Michael J. Erickson, P.E.
SRI/FS Project Coordinator



Dennis Capria
Data Quality Assurance Manager

**Multi-Area Data Management
Plan**

Allied Paper, Inc./Portage Creek/
Kalamazoo River Superfund Site

Supplemental Remedial
Investigations/Feasibility Studies

Prepared for:
Kalamazoo River Study Group

Prepared by:
ARCADIS
10559 Citation Drive
Suite 100
Brighton
Michigan 48116
Tel 810.229.8594
Fax 810.229.8837

Ref.:
B0064524

Date:
June 13, 2008

This document is intended only for the use of the individual or entity for which it was prepared and may contain information that is privileged, confidential and exempt from disclosure under applicable law. Any dissemination, distribution or copying of this document is strictly prohibited.



1. Introduction	1-1
1.1 SRI/FS Objectives	1-1
1.2 Purpose of Data Management	1-1
2. Data Management Procedures	2-1
2.1 Sample Designation System	2-2
2.1.1 Location Identification	2-2
2.1.2 Sample Identification	2-3
2.1.3 Characterization Information	2-7
2.2 Field Activities	2-8
2.2.1 Documentation	2-9
2.2.1.1 Daily Production Documentation	2-9
2.2.1.2 Sampling Information	2-10
2.2.1.3 Air Monitoring	2-10
2.2.1.4 Geological Investigation Records	2-11
2.2.1.5 Chain of Custody	2-11
2.2.1.6 Field Equipment, Calibration, and Maintenance Logs	2-11
2.2.1.7 Field Reports	2-12
2.2.2 Data Security	2-12
2.2.3 Quality Control Samples	2-12
2.2.4 Corrective Actions	2-13
2.3 Sample Tracking and Management	2-14
2.4 Data Management System	2-15
2.4.1 Survey Information	2-15
2.4.2 Field Observations	2-16
2.4.2.1 General	2-17
2.4.3 Analytical Results	2-18
2.4.4 Data Review and Analysis	2-19



2.4.5	Graphical Information System Development	2-19
2.5	Document Control and Inventory	2-19
3.	References	3-1

Tables

Table 2-1	Sediment Sampling Field Data
Table 2-2	Soil Sampling Field Data
Table 2-3	Surface Water Sampling Field Data
Table 2-4	Biota Sampling Field Data
Table 2-5	Groundwater Sampling Field Data
Table 2-6	Air Monitoring Field Data

Figures

Figure 1-1	Areas of the Site
Figure 2-1	Data Management Flow Chart - Sediment
Figure 2-2	Data Management Flow Chart - Soil
Figure 2-3	Data Management Flow Chart - Surface Water
Figure 2-4	Data Management Flow Chart - Biota
Figure 2-5	Data Management Flow Chart - Groundwater
Figure 2-6	Data Management Flow Chart - Air

Appendices

A	ARCADIS Electronic Data Deliverable Format
B	Kalamazoo River Database Data Dictionary



Acronyms and Abbreviations

AOCs	Administrative Settlement Agreements and Orders on Consent
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CLP	Contract Laboratory Program
COC	chain-of-custody
CSV	comma separated value
DQOs	data quality objectives
EDD	electronic data deliverable
FIELDS	Field Environmental Decision Support
FSP	Field Sampling Plan
Georgia-Pacific	Georgia-Pacific Corporation
GIS	geographical information system
ID	identification
IDW	investigation derived waste
KRSG	Kalamazoo River Study Group
Mill Properties	former paper mill properties
MS	matrix spike
MSD	matrix spike duplicate
NAD 83	North American Datum 1983
NGVD 1929	National Geodetic Vertical Datum of 1929
OU	Operable Unit
PCBs	polychlorinated biphenyls
PPE	personal protective equipment
QA	Quality Assurance
QAPP	Quality Assurance Project Plan
QA/QC	quality assurance/quality control
QC	quality control
RI	Remedial Investigation
RI/FS	Remedial Investigation/Feasibility Study
RTK GPS	Realtime Kinematic Global Positioning System
SADA	Spatial Analysis and Decision Assistance
SOPs	standard operating procedures
SOW	Statement of Work
SRI	Supplemental Remedial Investigation
SRI/FS	Supplemental Remedial Investigation/Feasibility Study
TAL/TCL	Target Analyte List/Target Compound List
USCS	Unified Soil Classification System
USEPA	United States Environmental Protection Agency
VSP	Visual Sample Plan



1. Introduction

On February 21, 2007 Georgia-Pacific Corporation (Georgia-Pacific) and Millennium Holdings, LLC, collectively referred to as the Kalamazoo River Study Group (KRSG), voluntarily entered into an Administrative Settlement Agreement and Order on Consent (AOC) with the United States Environmental Protection Agency (USEPA) that will govern the majority of work from this point forward at the Allied Paper, Inc./Portage Creek/Kalamazoo River Superfund Site (Site or Superfund Site), located in Kalamazoo and Allegan counties in southwest Michigan (Figure 1-1). The agreement, which describes a series of supplemental remedial investigations and feasibility studies (SRIs/FSs) that will be carried out over the next several years in Operable Unit (OU) 5 of the Site, is referred to as the SRI/FS AOC (Comprehensive Environmental Response, Compensation, and Liability Act [CERCLA] Docket No. V-W-07-C-864). OU5 encompasses approximately 80 miles of the Kalamazoo River, including a stretch of Portage Creek from Alcott Street to its confluence with the Kalamazoo River.

1.1 SRI/FS Objectives

As described in the Statement of Work (SOW) included as Attachment A to the SRI/FS AOC, primary objectives of the SRIs/FSs are to evaluate the nature and extent of hazardous substances, pollutants, or contaminants at and/or associated with the seven Areas of OU5 defined in the SRI/FS AOC; to assess the potential risks to human health and the environment posed by these hazardous substances, pollutants, or contaminants; and to assess alternatives for addressing the impacts to human health and the environment at each Area. The SOW governs work in seven distinct Areas of OU5 and specifies a requirement for the investigation of several former paper mill properties (Mill Properties) to determine whether each Mill Property is a source or potential source of polychlorinated biphenyls (PCBs) to the Site.

1.2 Purpose of Data Management

This *Multi-Area Data Management Plan* (Plan) will be implemented in conjunction with the *Multi-Area Quality Assurance Project Plan* (QAPP) (ARCADIS BBL 2007a), the *Multi-Area Field Sampling Plan* (FSP) (ARCADIS BBL 2007b), Area-specific SRI/FS work plans, and Area-specific Addenda to the Multi-Area FSP to collectively provide a standardized system for generating, tracking, storing, and accessing the large body of Site data. The Multi-Area FSP establishes Standard Operating Procedures (SOPs) for environmental sampling activities expected or likely to be conducted for purposes of completing current and future Area-specific SRI/FS work plans. Specific field sampling activities are or will be defined in the SRI/FS work plans and addenda to the Multi-Area FSP developed for each of the seven Areas of OU5. Each addendum to the Multi-Area FSP will provide Area-specific details on sampling objectives and



locations, frequency of sampling, associated sampling and field procedures for each matrix being investigated, sample handling and documentation, and field quality assurance/quality control (QA/QC) procedures. General sampling and field procedures for each matrix being investigated, sample handling and documentation, and field QA/QC procedures are also presented in the Multi-Area QAPP.

This Plan, which was referenced in the Multi-Area QAPP, was developed to establish a series of standards for documentation of field activities, data security, quality control, corrective actions, sample tracking and management, data management, and document control such that all data collected as part of the SRI/FS activities will be accurate, accessible, and consistent with applicable analytical and reporting objectives.

Development of the comprehensive management approach described in this Plan is a critical step in the overall SRI/FS framework since a project of this geographic and temporal scope can present significant challenges to collecting consistent, comparable data that can be reliably accessed and analyzed in multiple ways. Indeed, implementation of the SRI/FS activities will generate a significant number of samples from a variety of matrices across a broad geographic expanse that will be analyzed for a variety of constituents. Subsurface and surface terrestrial environments, aquatic environments, and industrial facilities will be investigated, and samples of soil, sediment, surface water, groundwater, biota, and air will be collected. From the large amount of resulting data, the need arises for a structured, comprehensive, and efficient program for management of Site data.

Section 2 of this Plan presents the data management procedures established for the Site. These procedures are consistent with historical practices employed since 1993 so that the new data collected as part of the SRI/FS activities can be used to enhance the already robust project database. Specifically, the procedures for designating samples, documenting field activities, securing data, establishing quality control, conducting corrective actions, tracking and managing samples, managing the data, and storing the records are described.



2. Data Management Procedures

Environmental investigations at the Site will include sampling to:

- characterize existing conditions with respect to PCB and Target Analyte List/ Target Compound List (TAL/TCL) constituents and the nature and extent of PCBs within the Site
- monitor PCB trends in environmental media (e.g., sediment, soil, surface water, and biota)
- monitor the effects of remedial actions

Data quality objectives (DQOs) are or will be established in the Multi-Area QAPP (ARCADIS BBL 2007a), addenda to the Multi-Area FSP, and the Area-specific SRI/FS work plans.

Sampling and monitoring activities conducted during the SRI/FS activities may include the following:

- Sediment sampling
- Soil sampling (shallow and deep)
- Surface water monitoring
- Biota sampling
- Groundwater monitoring
- Ambient air monitoring
- Bathymetric and topographic surveying
- Investigation derived waste (IDW) sampling (if needed)



As described in USEPA guidance (1988), a data management plan is to address the following five elements:

- 1) sample designation system
- 2) documentation of field activities
- 3) sample tracking and management
- 4) data management system
- 5) document control and inventory

Each of these data management elements is described in detail in the following subsections.

2.1 Sample Designation System

A standardized and consistent sample designation system is an important part of the Site sampling activities. The system described here will be used to generate unique location and sample identification numbers for each field sample collected that will facilitate both sample tracking and re-sampling of certain locations to evaluate temporal changes. The location and sample identification numbers assigned during the SRI/FS activities will be consistent with those already in the existing project database.

2.1.1 Location Identification

An alpha-numeric system will be used by field personnel to assign a unique location identifier to each sample. The location identification (ID) will consist of two or three elements: 1) a two-, three-, or four-letter prefix to identify the area of the Site and the medium, 2) a sampling location number, and 3) a transect number (if applicable). The sample location ID prefixes listed on the next page will typically be used during the SRI/FS sampling events; however, other prefixes will be developed to suit specific investigations or sample types.



Standard Sample Location Identification Prefixes

Location Prefix	Location
MW-#	monitoring well
SWP-#	Portage Creek surface water
SWK-#	Kalamazoo River surface water
TES-##	Former Trowbridge Impoundment exposed sediment
OES-##	Former Otsego Impoundment exposed sediment
PES-##	Former Plainwell Impoundment exposed sediment
KF-##	Kalamazoo River floodplain soil
OM-#	Ottawa Marsh soil/sediment
PM-#	Pottawattomie Marsh soil/sediment
FF-#	Focused soil/sediment
RRA-#	Residential soil
TBSA-#	Terrestrial Biota Sampling Area
KL-#	Kalamazoo Lake sediment
AI-#	Allegan City Impoundment sediment
KPS-#	Geostatistical pilot study sediment sample
KPT-##	Kalamazoo River sediment transect
PPT-##	Portage Creek sediment transect

Example location IDs include:

SWK-1 = Kalamazoo River surface water sampling location 1 (River Street in Comstock)

OM-153 = Ottawa Marsh soil/sediment sample location 153

PPT1-1 = Portage Creek sediment sample location 1, sediment transect 1

Location IDs provide a link between survey information, field observations, and sample analytical results in the database; data from specific areas can be queried based on the location ID prefixes in the table above.

2.1.2 Sample Identification

In addition to the location ID, a unique sample ID number will be assigned to each sample collected from a specific location. The sample ID will consist of a letter identifying the area or reach, followed by a unique five digit sequential number. The following letter identifiers, which



are consistent with those used during prior field work, will be used during the implementation of the SRI/FS sampling efforts.

Standard Sample Letter Identifiers

Letter Identifier	Location
K	Kalamazoo River
P	Portage Creek
A	Allied Paper, Inc. Operable Unit
W	Willow Boulevard/A-Site Operable Unit
H	King Highway Landfill Operable Unit
T	12th Street Landfill Operable Unit
G	Georgia-Pacific Mill Property
S	Simpson Plainwell Paper Mill Property
X	Portage Paper Mill Property
F	Former King Mill Property
M	Former Monarch Mill Property
Q	Quality Control Samples (Lab Splits)
Z	King Street Storm Sewer

Following the letter identifier, a unique 5-digit sequential sample number will be used. The sample ID series listed below are consistent with those used in prior investigations and will be used during the implementation of the SRI/FS sampling efforts for any of these same matrixes that may potentially be sampled during future site investigations.



Sample Identification Series Values

Location	Sample Identification Series	Sample Type Identifier Sequence	Sample Matrix
Kalamazoo River & Portage Creek (K,P,Z)	10,000	10000-11999	Kalamazoo River/Portage Creek Floodplain Soils
		12000-13999	Ecological Assessment Soil Samples (TBSA)
		14000-15999	Reserved as additional IDs
		16000-17999	Geochronological dating/PCB deposition
		18000-18099	King Street Storm Sewer Soil Samples
		18100-18999	Sediment Samples
		19000-19100	King Street Storm Sewer Water Samples
		19101-19999	Reserved as additional IDs
	20,000	20000-22499	Sediment - Stratified Sampling (Marsh Sampling)
		22500-24999	Geostatistical Samples
		25000-27499	Exposed Former Impoundment Sediments
		27500-29999	Reserved as additional IDs
	30,000	30000-33999	Base Flow Samples (Surface Water)
		34000-37999	High Flow Event Samples (Surface Water)
		38000-39999	Reserved as additional IDs
	40,000	40000-41999	Fish Samples
		42000-43999	Turtle Samples
		44000-45999	Deer Mice Samples
		46000-49999	Reserved as additional IDs
		50000-59999	River Sediment Sampling
Mill Properties (G,S,X,F,M)	50,000	50000-50999	Former King Mill Soil Samples
		51000-51999	Former King Mill Water Samples
		52000-52999	Georgia-Pacific Mill Soil Samples
		53000-53999	Georgia-Pacific Mill Water Samples
		G#F###,G#P###	Georgia-Pacific Mill Air Samples
		54000-55999	Portage Paper Mill
		56000-57999	Simpson Plainwell Paper Mill
		58000-59999	Reserved as additional IDs



Location	Sample Identification Series	Sample Type Identifier Sequence	Sample Matrix
Allied Paper, Inc. Operable Unit (A)	60,000	60000-62999 63000-63999 64000-65999 66000-66499 66500-66999 67000-67999 68000-68999 69000-69100 69101-69300 69301-69999	Residuals/Soils Characterization Sediment Samples Base Flow Samples - Surface Water Groundwater Samples Event Base Flow Samples - Surface Water Biota Samples - Fish Air Samples Clarifier Samples Geotechnical Samples Reserved as additional IDs
Willow Boulevard/ A-Site Operable Unit (W)	70,000	70000-73999 74000-75999 76000-76999 77000-77999 78000-78999 79000-79499 79500-79999 W#F###,W#P###	Residuals/Soil Characterization Samples Groundwater Investigation Samples Surface Water Samples Reserved as additional IDs Sediment Samples Geotechnical Samples Reserved as additional IDs Air Samples
King Highway Landfill Operable Unit (H)	80,000	80000-83999 84000-85999 86000-86999 87000-87499 87500-87999 88000-89999 H#F###,H#P###	Residuals/Soils Characterization Samples Groundwater Investigation Samples Sediment Investigation Samples Surface Water Samples Geotechnical Samples Reserved as additional IDs Air Samples
12th Street Landfill Operable Unit (T)	90,000	90000-93999 94000-95999 96000-99999	Residuals/Soils Characterization Samples Groundwater Investigation Reserved as additional IDs



Example Sample IDs include:

P18100 = Portage Creek sediment sample

K42100 = Turtle sample from the Kalamazoo River

K34050 = High flow event surface water sample from the Kalamazoo River

A74130 = Groundwater sample from the Allied OU

These unique sample IDs provide a link between the field data, analytical data, and QA/QC information. The alphanumeric code can be used to query the data according to location and sample type, as illustrated above.

2.1.3 Characterization Information

In addition to the unique pair of location and sample IDs, other sample information from the field notes will be stored in the database to characterize individual samples, including river reach, geographic coordinates, sample depths, sample media, field measurements, and other applicable data. The following letter river reach identifiers, which are consistent with those used during prior field work, will be used during the implementation of the SRI/FS sampling efforts. The additional data will vary by sample type, and are listed by media and database table in the data dictionary that accompanies the Kalamazoo River database. The data dictionary is provided in Appendix B, and provides details on the tables and data fields within the tables of the database.

River Reach Identifiers

Letter Identifier	River Reach
A0	Morrow Lake
A1	Morrow Dam to Portage Creek Confluence
A2	Portage Creek Confluence to Main Street Plainwell
B	Main Street, Plainwell to Plainwell Dam
C	Plainwell Dam to Otsego City Dam
D	Otsego City Dam to Otsego Dam
E	Otsego Dam to Trowbridge Dam
F	Trowbridge Dam to Allegan City Line



Letter Identifier	River Reach
G	Allegan City Line to Allegan City Dam
H	Allegan City Dam to Allegan Dam
I	Downstream of Allegan Dam
P	Portage Creek

Samples collected for QA/QC purposes will be recorded in the field notes and on the chain-of-custody (COC) forms, and the associated sample containers will be labeled with one of the suffixes described below. If applicable, QA/QC samples will be stored with the associated standard sample. QA/QC samples will be identified as follows:

- Trip blanks will be designed with “TB” followed by a two-digit sample number beginning with the next consecutive number for that sample day (i.e., “01”), followed by the date of collection (i.e., TB01-050107 = the first trip blank collected on May 1, 2007).
- Rinse blanks will be designated with the associated sample location followed by “RB” and a two-digit sample number (i.e., “01”) indicating the number of rinse blank collected for that sample location (i.e., P18100-RB01 = the first rinse blank collected with Portage Creek sediment sample P18100).
- Matrix spike (MS) and matrix spike duplicate (MSD) analysis will be designated with “MS or MSD” at the end of the sample identification (i.e., P18100 (MS/MSD) = matrix spike/matrix spike duplicate sample collected from Portage Creek sediment sample number P18100).
- Field duplicates will be labeled as ordinary field samples with a unique ID number. Duplicate samples will not be identified, and the laboratory will analyze them as “blind” QC samples. A note will be made in the field logbook or on the sample data sheet indicating the duplicate sample identification. This information is provided to the database administrator, and the corresponding parent/duplicate sample IDs are stored in the database with the other sample information in a “QA/QC” field within the FIELDINFO table.

2.2 Field Activities

Field activities designed to gather the information necessary to make decisions regarding the Site require consistent documentation and accurate recordkeeping. During the SRI/FS, standardized procedures will be used for documentation of field activities, data security,



QA/QC, and corrective actions. These procedures are described in further detail in the following subsections.

2.2.1 Documentation

Field personnel will provide comprehensive documentation covering aspects of field sampling, field analysis, and COC. This documentation generates a record that will allow reconstruction of field events, thereby aiding subsequent data review and interpretation.

Documents, records, and information relating to the performance of the work at the Site will be retained. Field forms are presented in Appendix B of the Multi-Area FSP (ARCADIS BBL 2007b). The types of field documentation that will be maintained throughout the sampling activities are briefly outlined below.

2.2.1.1 Daily Production Documentation

Each field crew will maintain a dedicated field logbook consisting of a waterproof, bound notebook that will contain a record of activities performed at the Site, including:

- Project name and number
- Sample locations
- Sample descriptions
- Sample dates
- Weather conditions
- Sampling times
- Sample identification numbers
- Sample collection methods
- Sample handling (i.e., filtering) and preservation
- Specific readings for site testing and sampling



- Field instruments and calibration/operation notes
- Field measurement data
- Samplers' names
- Any appropriate comments

Data will be entered in ink with the date and signature of the individual responsible for data entry; blank pages will be noted as being intentionally blank. Each page will be sequentially numbered so that a future reviewer will be able to readily identify if a page is missing. Erroneous entries will be corrected by crossing out the original entry, initialing it, and then documenting the proper information.

2.2.1.2 Sampling Information

During surface water, soil, and sediment sampling, detailed notes will be made as to the exact location of sampling, physical observations, sample depths, and weather conditions. Biota sampling locations will be identified by river reach. These notes will be recorded in the field logbook or in the designated field sample log (Multi-Area FSP, Appendix B).

In addition, for surface water sampling, field measurements of temperature, pH, conductivity, turbidity, and dissolved oxygen will be recorded in the field logbook or the Surface Water Sampling Log (Multi-Area FSP, Appendix B) along with notable observations on the physical appearance of the water.

For groundwater sampling, a Groundwater Sampling Log (Multi-Area FSP, Appendix B) will also be filled out during each sampling event and will contain sample location, water level measurements, well depths, physical observations of the water, and field measurements (temperature, pH and conductivity). Water level readings will be measured to surveyed reference points (i.e., top of casing).

2.2.1.3 Air Monitoring

As indicated in the *Multi-Area Health and Safety Plan* (Multi-Area HSP) (ARCADIS BBL 2007c), air monitoring may be conducted to determine worker exposure to airborne constituents. Monitoring will be performed at the discretion of the SRI/FS Health and Safety Site Supervisor based on a qualitative assessment of the particular field activity and previously



measured air monitoring results for similar activities conducted at the Site. When performed, air results will dictate work procedures and the selection of personal protective equipment (PPE).

Air monitoring equipment will be calibrated in accordance with the manufacturer's recommendations. Air monitoring results will be recorded in the field logbook or on the Air Monitoring Log (Multi-Area FSP, Appendix B).

2.2.1.4 Geological Investigation Records

For soil and sediment samples, Subsurface Soil Logs and Sediment Sampling Logs (Multi-Area FSP, Appendix B) will be completed. The Subsurface Soil Logs will contain a record of information and description of the subsurface strata and geotechnical characteristics observed during sampling. Boring samples will be lithologically described using the Unified Soil Classification System (USCS). Sediment samples will also be lithologically described using the USCS.

2.2.1.5 Chain of Custody

Completed COC forms will be required for all samples to be analyzed. COC forms will be initiated by the sampling crew in the field during the sample collection events. The COC forms will contain the sample's unique ID number, sample date and time, sample description, sample type, sample preservation (if any), and analyses required. The COC forms will remain with the samples at all times. The original COC forms will accompany the samples to the laboratory, and copies will be made prior to shipment (or multiple copy forms used) for separate field documentation. Copies of COC forms will be maintained in ARCADIS's Syracuse, New York office. A blank COC form is included in Appendix A of the Multi-Area FSP (SOP F-12, *Sample Handling, Packing and Shipping Procedures*).

2.2.1.6 Field Equipment, Calibration, and Maintenance Logs

Field equipment will be calibrated and maintained per the individual equipment manufacturer instructions and procedures. To document the calibration and maintenance of field instrumentation, calibration and maintenance logs (Multi-Area FSP, Appendix B) will be maintained for each piece of field equipment. Field instrumentation will be calibrated once daily or as needed in accordance to the manufacturer's instructions.



2.2.1.7 Field Reports

Following completion of sampling activities, field staff will prepare field reports and submit to the Project Coordinator and Data Quality Assurance (QA) Manager. The content of the reports will include:

- A brief description of field activities
- Performance audit summaries, including assessment of measurement data accuracy, precision, and completeness
- Significant QA/QC problems and recommended solutions
- Resolutions of previously stated problems

Field reports will be reviewed by the Field Program Coordinator prior to submittal to the Database Manager. The matrix of Project Personnel is provided in the Multi-Area QAPP (ARCADIS BBL 2007a).

2.2.2 Data Security

Measures will be taken during the field investigation to avoid loss, damage, or alteration of samples and records. When not in use, all field notebooks will be stored in a secure ARCADIS office. Access to these files will be limited to appropriate personnel.

2.2.3 Quality Control Samples

Sample types may include surface water, sediment (i.e., exposed sediment and in-river sediment), soil (i.e., bank soil and floodplain soil), biota, and groundwater. Diligent adherence to SOPs described in the Multi-Area FSP (ARCADIS BBL 2007b) is necessary to achieve a high degree of confidence in the data generated from these various types of field samples. The rationale for and required frequency of quality control (QC) samples is provided in the Multi-Area QAPP (ARCADIS BBL 2007a).

The following types of field QC samples will be collected as part of the SRI/FS sampling efforts:

- Field Duplicates – two samples collected from the same location at the same time. Field duplicates will be used to assess environmental variability and laboratory performance. Field duplicate sample containers will be labeled as ordinary field samples with their own



separate unique identification. The samples will not be identified as duplicates; thus, the laboratory will analyze them as "blind" audit samples.

- Rinse Blanks – samples of distilled/deionized water that have been poured over sampling equipment after decontamination procedures have been performed. These samples will be used to evaluate the effectiveness of the cleaning procedures used.
- Trip Blanks – samples of distilled/deionized water that will be used to check for analytes introduced during shipping and handling of the samples prior to, during, and after sample collection. Trip blanks will only be utilized for samples to be analyzed for volatile organic compounds (VOCs).

2.2.4 Corrective Actions

Corrective actions include procedures to promptly investigate, document, evaluate, and correct any deficiencies in data quality. If a condition is noted to have an adverse effect on data quality, corrective action will be taken to avoid this condition in the future. Condition identification, cause, and the corrective action implemented will be documented and reported to the Project Coordinator and Data QA Manager. Implementation of corrective measures will be verified by documented follow-up action.

Project personnel have the responsibility, as part of their normal work duties, to promptly identify and report conditions adverse to data quality. Project personnel will, therefore, continuously monitor ongoing work performance in the normal course of daily responsibilities.

Examples of situations that would require corrective actions include the following:

- Protocols, as defined in the Multi-Area QAPP (ARCADIS BBL 2007a) and Multi-Area FSP (ARCADIS BBL 2007b), have not been followed
- Predetermined data acceptance standards are not obtained
- Procedures have not been performed properly
- Equipment is not properly calibrated, or is not functioning correctly
- Sample and test results are not completely traceable
- QC requirements have not been met



- Proper approvals have not been granted
- Concerns resulting from system or performance audits are identified

Corrective actions will be documented on a Corrective Action Form (Multi-Area FSP, Appendix B).

2.3 Sample Tracking and Management

A record of all field documentation, as well as analytical and QA/QC results, will be maintained to verify the validity of data used in the Site analyses. To effectively generate such documentation, carefully constructed sample tracking and data management procedures will be used throughout the SRI/FS sampling program.

Sample tracking begins with the completion of COC forms as described in the Multi-Area QAPP (ARCADIS BBL 2007a) and Multi-Area FSP (ARCADIS BBL 2007b), and summarized in Section 2.2.1.5. On a daily basis, the completed COC forms associated with samples collected that day will be faxed from the project office to the Data QA Manager. Copies of all completed COC forms will be maintained in the field office. Following receipt of the COC forms, the Data QA Manager will telephone or email the laboratory to verify receipt of samples and ask that the laboratory email a copy of the assigned laboratory sample identification numbers. (Note: The laboratory sample identification numbers are used as internal tracking numbers by the laboratory.) Project personnel will then enter the following information into the sample tracking system:

- Project sample identification numbers
- Laboratory sample identification numbers
- Sample collection date
- Laboratory sample receipt date
- Analytical analyses specified on the COC form
- Sample data group number



The information contained in the sample tracking system will allow multiple users to track the status of each sample and the associated analyses from collection through the reporting stages.

When analytical data are received from the laboratory, the Data QA Manager will review the incoming analytical data packages against the information in the sample tracking system to confirm that the correct analyses were performed for each sample and that results for all samples submitted for analysis are received. The Data QA Manager will promptly notify the laboratory of any discrepancies. The use of the sample tracking system will facilitate efficient sample tracking and will assist the project team in the performance of the SRI/FS sampling program.

2.4 Data Management System

In parallel with the sample tracking system, the project team will also maintain the data management system originally created at the start of the initial Site investigation in 1993. The key component of the data management system is the existing Site database, which was developed in 1993 and presently contains all Remedial Investigation/Feasibility Study (RI/FS) data collected to date. The database is in Microsoft Access, and has features that allow for easy management, manipulation, and retrieval of data. The project database will be maintained by the Database Manager. SRI/FS information added to the database will include a combination of field, analytical and QA/QC information. The database itself is a series of tables containing different types of sample data, including survey data, field data, QA/QC data, and analytical results. Location ID is a common field in several tables can be used to link survey information and field observations with sample analytical results. Each unique sample ID can be used to link tables containing the field, analytical, and QA/QC information. The data dictionary for the Kalamazoo River database is included in Appendix B. In addition, final SRI/FS data, including sample locations, depth, and analytical results will be incorporated into ArcGIS 9.2, a geographical information system (GIS) for mapping and spatial analysis.

The three primary sources of information entered into the database are results from surveys of sampling locations, field observations, and analytical results. Each of these data sources is discussed in the following sections.

2.4.1 Survey Information

In general, each location sampled as part of the SRI/FS activities will be surveyed to verify accurate documentation of sample locations for mapping purposes and to facilitate the re-sampling of select sample locations during future monitoring programs, if needed. Exceptions



to this general rule include biota sampling locations, which will be identified by river reach, and any existing groundwater monitoring wells and surface water sampling locations that have been previously surveyed.

Surveying will typically be conducted using a Realtime Kinematic Global Positioning System (RTK GPS). If the RTK GPS is not useable due to, for example, heavy foliage or inadequate satellite coverage, conventional ground survey methods will be used. The field surveying activities will consist of the collection of information needed to compute a northing and easting in state plane coordinates for each sample location (North American Datum 1983 [NAD 83] State Plan Michigan South, International Feet) and the collection of information to compute elevations (relative to the National Geodetic Vertical Datum of 1929 [NGVD 1929]) for select sample locations, as appropriate. Survey data will be downloaded into a personal computer for processing with surveying software, and subsequently transferred to the ARCADIS network server located in Syracuse, New York.

Following computation of a location's state plane coordinates and elevations, a licensed land surveyor will conduct a QA/QC review of the computer information. Following the approval of the computed information, the coordinates and elevations will be transferred to the Data Manager both in a digital and a hard copy format. Survey data will also be incorporated into the Site database and the GIS. All field books associated with the surveying activities will be stored as a record of the project activities.

2.4.2 Field Observations

An important part of the information that will ultimately reside in the data management system for use during the SRI/FS will originate in the observations that are recorded in the field. Procedures that will be used to record field observations are summarized in Section 2.2.1 and are presented in more detail in the Multi-Area FSP (ARCADIS BBL 2007b).

A summary of the information that will, at a minimum, be recorded during sediment, soil, surface water, biota, groundwater, and air sampling are summarized in Tables 2-1 through 2-6, respectively. In addition, Figures 2-1 through 2-6 depict the general data flow of the field observations from sample collection through inclusion in the data management system for each medium. The procedures that will be used to manage the field observation information for each medium are presented below.



2.4.2.1 General

Following each sampling event, a status memorandum will be prepared by the field personnel who performed the sampling activities to present a summary and a record of the sampling event. Topics to be discussed include the locations sampled, the sampling methodologies used, QA/QC procedures, blind duplicate and MS/MSD sample identification numbers, equipment decontamination procedures, personnel involved in the activity (including non-ARCADIS personnel present), and any other noteworthy events that occurred. Copies of the field notes or applicable sampling logs will be attached, as well as tabular summaries of the field data. The types of information that will be summarized, at a minimum, for sediment, soil, surface water, biota, groundwater, and air sampling are presented on Tables 2-1 through 2-6, respectively.

Status memoranda are valuable both as a mechanism for informing project personnel of the details of the field activities and as a tool for guiding the development of reports. Each status memorandum will be reviewed for accuracy and completeness by the respective sampling activity task manager. Following the approval and finalization of each memorandum, the status memorandum will be used to transfer field observations into the data management system.

As discussed in Section 2.2.1.2, field notes will be recorded in the field logbook or in the designated field sample logs (Multi-Area FSP, Appendix B). The forms provide a standardized method of reporting field observations for future reference and serve as a data input form for the data management system.

In addition to describing the procedures implemented during the sampling of each medium, boring logs will be completed during the advancement of boring logs or installation of monitoring wells and filed for future reference. A copy of each log will be used to create a digital boring log using a software package (i.e., Rockware). The software will facilitate the production of presentation and interpretive graphics such as fence diagrams and geologic cross-sections. The finalized boring logs will be used for interpretation and reporting purposes.

If determined necessary, onsite meteorological data may be collected from local meteorological stations. Measured parameters may include wind speed, wind direction, solar radiation, relative humidity, temperature, and barometric pressure. Following a QA/QC check, these data will be transferred to the data manager for inclusion in the data management system.



2.4.3 Analytical Results

Analytical results provided by the laboratory will generally be available in both a digital and a hard copy format. Upon receipt of each analytical package, the original COC form will be placed in the main project files at ARCADIS's office in Syracuse, NY.

After the Data QA Manager completes an initial review of the analytical data packages compared to the information in the sample tracking system (as described in Section 2.3), each data package will undergo a QA/QC review in accordance with the procedures presented in the Multi-Area QAPP (ARCADIS BBL 2007a). Any data that do not meet the standards presented in the Multi-Area QAPP will be flagged pending resolution of the issue. The flag will not be removed from the data until the issue associated with the sample result is resolved. Although flags may remain for certain data, the use of that data may not necessarily be restricted.

Following completion of the data validation, the digital files will be used to populate the appropriate database tables. An example of the electronic data deliverable (EDD) format is included in Appendix A. This format specifies one data record for each constituent for each sample analyzed. Specific fields include:

- Sample identification number
- Date sampled
- Date analyzed
- Parameter name
- Analytical result
- Units
- Detection limit
- Qualifier(s)

The individual EDDs, supplied by the laboratory in either an ASCII comma separated value (CSV) format or in a Microsoft Excel worksheet, will be loaded into the appropriate database table via a custom-designed user interface Visual Basic program. Any analytical data that cannot be provided by the laboratory in electronic format will be entered manually. After entry



into the database, the EDD data will be compared to the field information previously entered into the database to confirm that all requested analytical data have been received.

2.4.4 Data Review and Analysis

The data management system will have several functions to facilitate the review and analysis of the SRI/FS data. Data entry screens will be developed to assist in the key punching of field observations. Routines will also be developed to permit the user to scan analytical data from a given location/area for a given medium. Several output functions that have been developed by ARCADIS will be appropriately modified for use in the data management system.

A valuable function of the data management system will be the generation of tables of analytical results from the project database. The capability of the data management system to directly produce tables reduces the redundant key punching of analytical results during report preparation and precludes transcription errors that may occur otherwise. Tables of analytical data will be produced as part of data interpretation tasks, the monthly reporting of data to the USEPA, and the generation of various SRI/FS reports.

2.4.5 Graphical Information System Development

While all sample-specific data will be maintained in the Access database, these data will be exported to ArcGIS 9.2 and combined with geographic data layers that are not compatible to storage in an Access database, such as aerial photographs, land use information, geomorphic features, roads, operable unit boundaries, and tax parcel information. ArcGIS 9.2 is the latest GIS platform from ESRITM, and includes powerful tools to store, query, manipulate, analyze, interpret, and display data of all types. These tools include the ability to interpolate data and compare multiple features and data sets while generating reproducible results. In addition, the software allows for easy export of spatial data for use in other software, such as TERRA Model and AutoCAD. As needed, other publicly-available, USEPA-approved GIS applications may be used for specific analyses, including but not limited to Field Environmental Decision Support (FIELDS), Visual Sample Plan (VSP), and Spatial Analysis and Decision Assistance (SADA).

2.5 Document Control and Inventory

ARCADIS maintains the complete project files for the Superfund Site in its Syracuse, NY office. Each client project is assigned a file/job number (i.e., for the SRI/FS, 64524). Each file is then broken down into the following subfiles:

#1 - Agreements and Contracts - all agreements and contracts involving the Site



- #2 - Correspondence - all external correspondence, including reports
- #3 - Memoranda - all internal and external memoranda
- #4 - Notes and Data - notes and data from field, laboratory, and internal calculations
- #5 - News Clippings - local newspapers, USEPA publications, and technical publications are sources of articles.

Originals, when possible, are placed in the files. The Syracuse, NY central files will be used to maintain the Site-specific record of the SRI/FS activities.



3. References

ARCADIS BBL. 2007a. *Multi-Area Quality Assurance Project Plan for the Allied Paper, Inc./Portage Creek/Kalamazoo River Superfund Site* (Multi-Area QAPP). April 2007.

ARCADIS BBL. 2007b. *Multi-Area Field Sampling Plan for the Allied Paper, Inc./Portage Creek/Kalamazoo River Superfund Site* (Multi-Area FSP). April 2007.

ARCADIS BBL. 2007c. *Multi-Area Health and Safety Plan for the Allied Paper, Inc./Portage Creek/Kalamazoo River Superfund Site* (Multi-Area HSP). May 2007.

USEPA. 1988. *Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA*, Office of Emergency and Remedial Response, OSWER Directive No. 9355.3-01, EPA/540/G-89/004, October 1988

ARCADIS

Tables

**Kalamazoo River Study Group
Allied Paper, Inc./Portage Creek/Kalamazoo River Superfund Site
Supplemental Remedial Investigations/Feasibility Studies
Multi-Area Data Management Plan**

Table 2-1 – Sediment Sampling Field Data

- Date
- Time
- Weather
- Sampling location
- Sample number
- Sampling personnel
- Sampling method
- Depth penetrated
- Length of core recovered
- Depth to top of core section
- Core section length
- Depth of water
- Lithology of sample¹
- Sampling location and sample
- Number of field duplicate (QA/QC samples)
- Stream flow (general flow conditions)
- Stream velocity (if applicable)
- Surface water elevation
- Survey coordinates
- Sediment probe depth
- Photographic documentation
- Constituents being analyzed
- Lab performing analysis

Note:

¹ Lithology includes: soil type, color, moisture content, texture, grain size and shape, and consistency.

**Kalamazoo River Study Group
Allied Paper, Inc./Portage Creek/Kalamazoo River Superfund Site
Supplemental Remedial Investigations/Feasibility Studies
Multi Area Data Management Plan**

Table 2-2 – Soil Sampling Field Data

- Date
- Time
- Sampling location
- Sample number
- Sampling personnel
- Sampling method
- Depth to water (if applicable)
- Maximum boring depth
- Depth to top of sample section
- Section length and percent recovered (if applicable)
- Lithology of sample¹
- Surface elevation
- Photoionization detector readings (for selected soils)
- Immunoassay screening results (if applicable)
- Survey coordinates
- Number of field duplicate (QA/QC samples)
- Photographic documentation
- Constituents being analyzed
- Lab performing analysis

Note:

¹ Lithology includes: soil type, color, moisture content, texture, grain size and shape, and consistency.

**Kalamazoo River Study Group
Allied Paper, Inc./Portage Creek/Kalamazoo River Superfund Site
Supplemental Remedial Investigations/Feasibility Studies
Multi-Area Data Management Plan**

Table 2-3 – Surface Water Sampling Field Data

- Date
- Time
- Weather
- General flow conditions
- Sampling location
- Sampling number
- Sampling personnel
- Sampling method
- pH
- Water temperature
- Air temperature
- Specific conductivity
- Physical appearance of sample¹
- Velocity profile²
- Staff gage reading (if available)
- Number of field duplicate (QA/QC samples)
- Survey coordinates
- General flow conditions
- Water depth
- Sample depth
- Photographic documentation (if applicable)
- Constituents being analyzed
- Lab performing analysis

Notes:

¹ Physical appearance includes: color, odor, suspended solids, and film.

² Methods for determining velocity profile are found in the separately submitted Multi-Area FSP.

**Kalamazoo River Study Group
Allied Paper, Inc./Portage Creek/Kalamazoo River Superfund Site
Supplemental Remedial Investigations/Feasibility Studies
Multi-Area Data Management Plan**

Table 2-4 – Biota Sampling Field Data

- Date
- Time
- Sampling location
- Sample number
- Sampling method
- Sampling personnel
- Species
- Gender (if possible)
- Length
- Weight
- External abnormalities
- Photographic documentation
- Constituents being analyzed
- Lab performing analysis
- Type of Sample

**Kalamazoo River Study Group
Allied Paper, Inc./Portage Creek/Kalamazoo River Superfund Site
Supplemental Remedial Investigations/Feasibility Studies
Multi-Area Data Management Plan**

Table 2-5 – Groundwater Sampling Field Data

- Date
- Time (start and finish)
- Sampling location/well Number
- Sample number
- Sampling personnel
- Sampling method
- Physical appearance of sample¹
- Water temperature
- Specific conductivity
- pH
- Weather
- Photoionization detector
- Photoionization detector readings
- Depth to water
- Calculated well volume
- Purge water (volume, pH, temperature, specific conductivity, purge equipment)
- Number of field duplicate (QA/QC samples)
- Survey coordinates
- Photo documentation (if applicable)
- Constituents being analyzed
- Lab performing analysis
- Turbidity, dissolved oxygen

Note:

¹ Physical appearance includes: color, odor, suspended solids, film.

**Kalamazoo River Study Group
Allied Paper, Inc./Portage Creek/Kalamazoo River Superfund Site
Supplemental Remedial Investigations/Feasibility Studies
Multi-Area Data Management Plan**

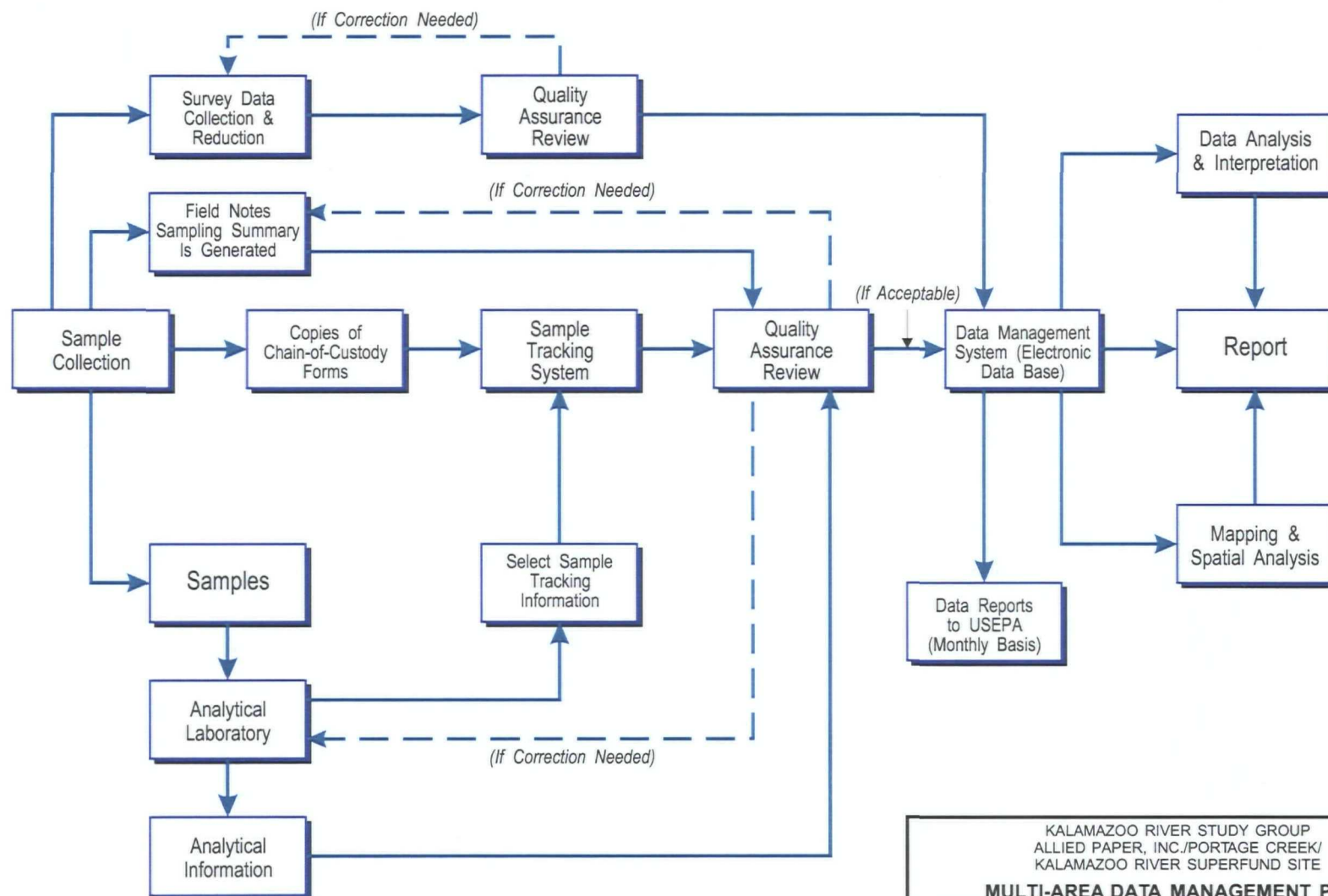
Table 2-6 – Air Monitoring Field Data

- Date
- Time
- Sample location
- Sample number
- Sampling personnel
- Wind speed
- Sampling method
- Wind direction
- Solar radiations
- Relative humidity
- Temperature
- Barometric pressure
- Survey coordinates
- Constituents being analyzed
- Lab performing analysis
- Number of field duplicate (QA/QC samples)



ARCADIS

Figures

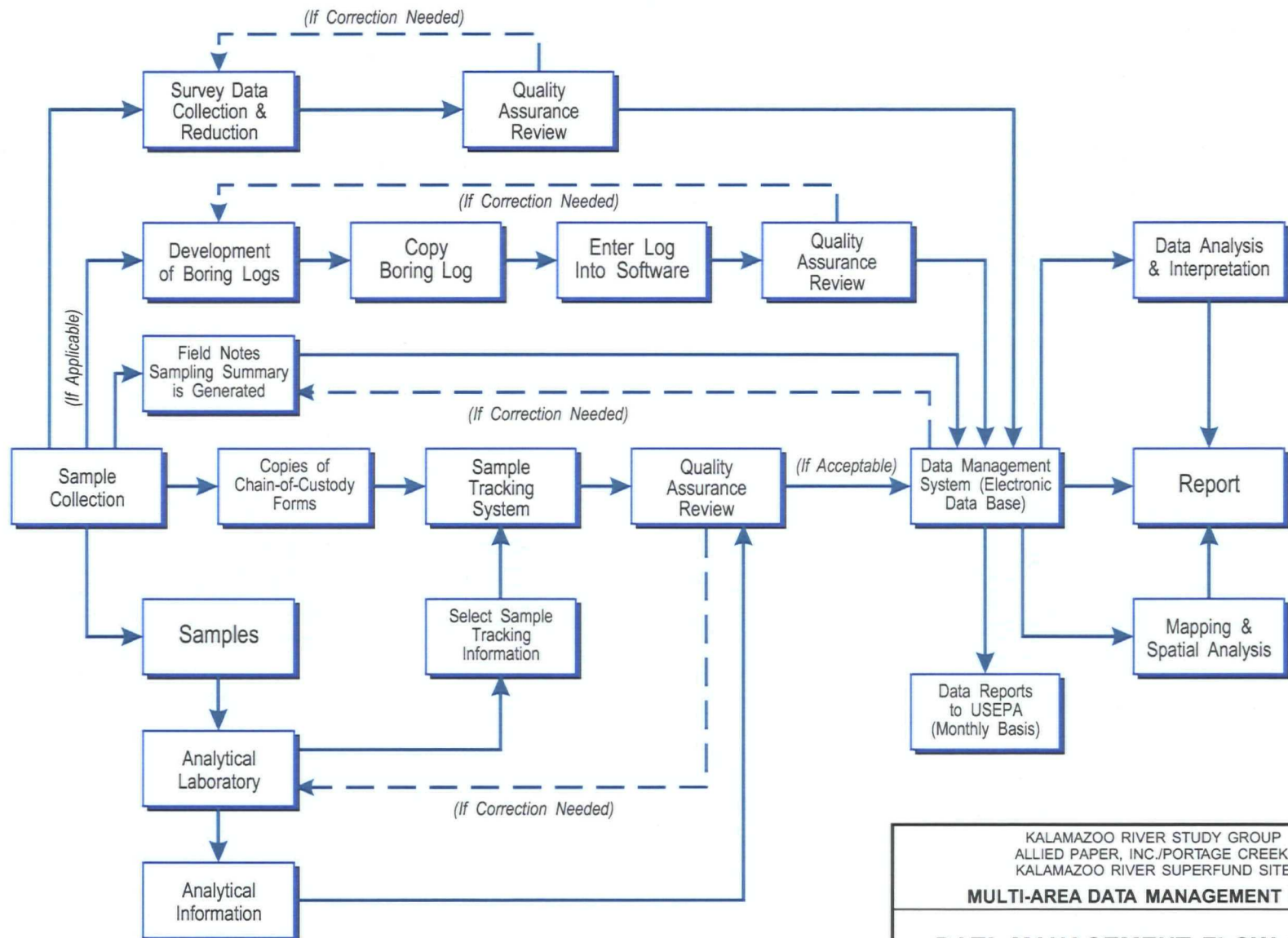



KALAMAZOO RIVER STUDY GROUP
ALLIED PAPER, INC./PORTAGE CREEK/
KALAMAZOO RIVER SUPERFUND SITE
MULTI-AREA DATA MANAGEMENT PLAN

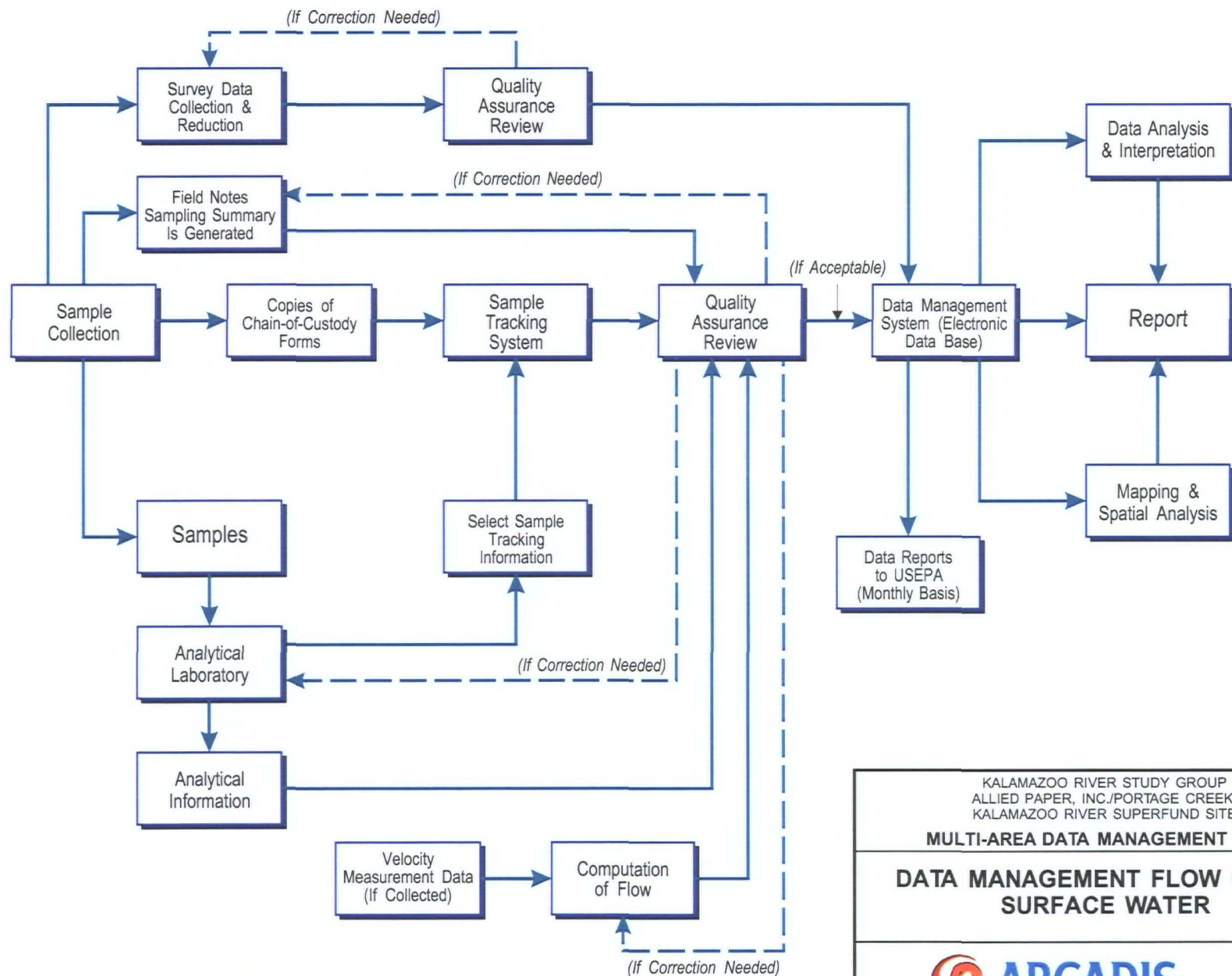
**DATA MANAGEMENT FLOW CHART
SEDIMENT**




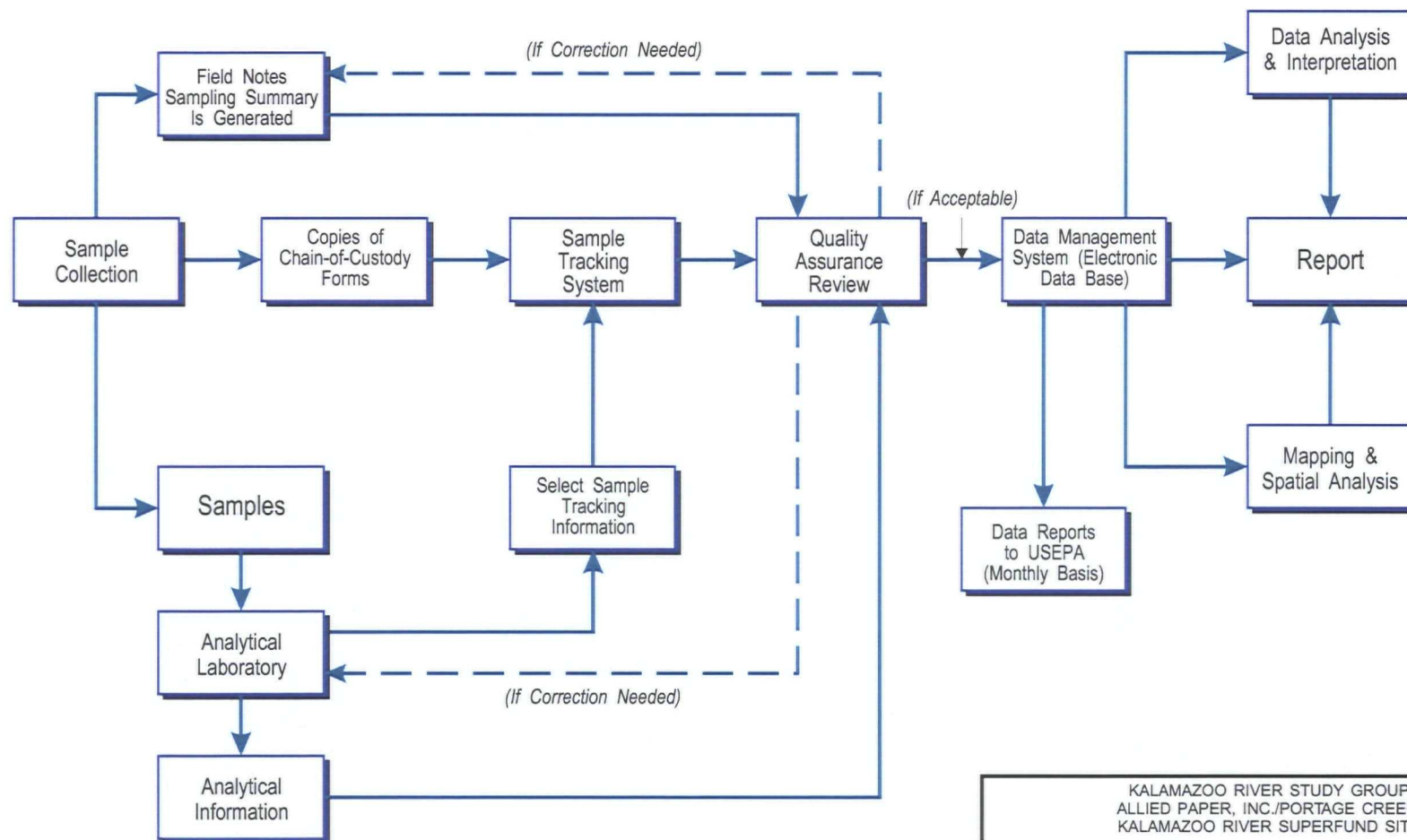
FIGURE
2-1



<p>KALAMAZOO RIVER STUDY GROUP ALLIED PAPER, INC./PORTAGE CREEK/ KALAMAZOO RIVER SUPERFUND SITE</p> <p>MULTI-AREA DATA MANAGEMENT PLAN</p>	
<p>DATA MANAGEMENT FLOW CHART</p> <p>SOIL</p>	
	<p>FIGURE</p> <p>2-2</p>



KALAMAZOO RIVER STUDY GROUP ALLIED PAPER, INC./PORTAGE CREEK/ KALAMAZOO RIVER SUPERFUND SITE	
MULTI-AREA DATA MANAGEMENT PLAN	
DATA MANAGEMENT FLOW CHART SURFACE WATER	
	FIGURE 2-3

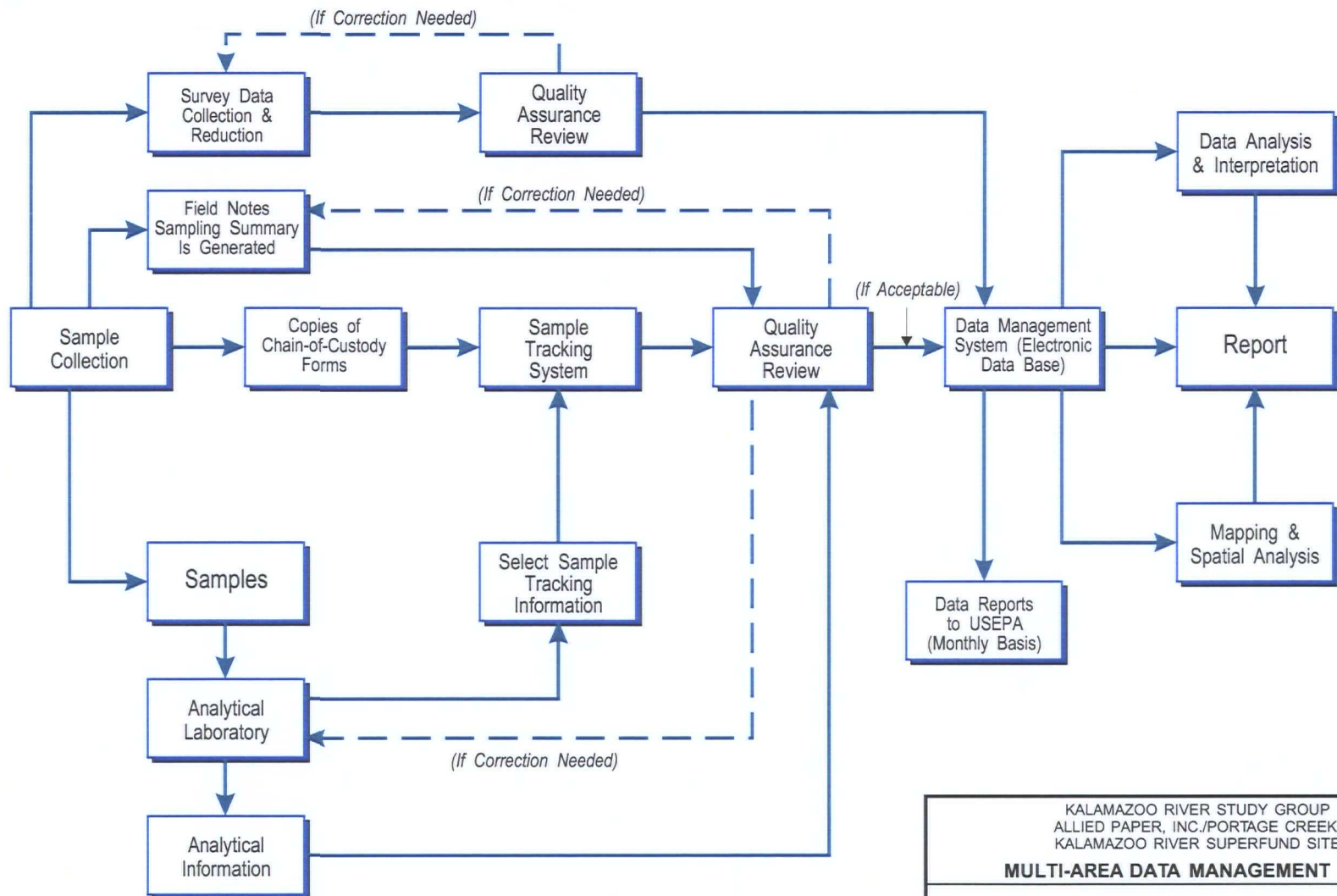


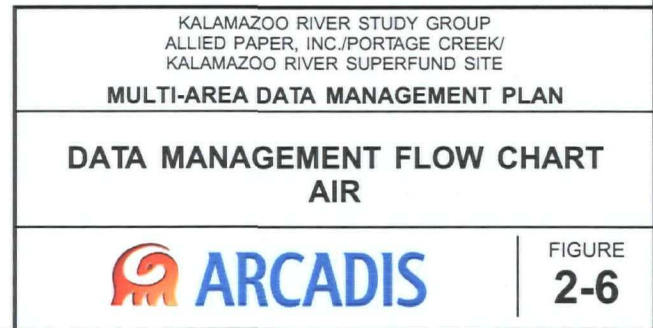
KALAMAZOO RIVER STUDY GROUP
ALLIED PAPER, INC./PORTAGE CREEK/
KALAMAZOO RIVER SUPERFUND SITE
MULTI-AREA DATA MANAGEMENT PLAN

DATA MANAGEMENT FLOW CHART BIOTA



FIGURE
2-4







ARCADIS

Appendix A

ARCADIS Electronic Data
Deliverable Format

Appendix A
ARCADIS Electronic Data Deliverable Format
ARCADIS Electronic Data Deliverable (EDD) Format

Field Name	Maximum Length	Data Type	Comments
FIELD SAMPLE ID	50	TEXT	From the chain of custody. Add "RE" or "DL" to differentiate reanalyses and dilutions.
SDG	50	TEXT	
LAB SAMPLE ID	50	TEXT	
MATRIX	10	TEXT	SOIL, WATER, SEDIMENT, etc.
SAMPLE TYPE	10	TEXT	FB, RB, TB, FD, FS for Field Blank, Rinse Blank, Trip Blank, Field Duplicate and Field Sample, respectively. DEFAULT TO FS
DATE COLLECTED	--	DATE/TIME	MM/DD/YY
TIME COLLECTED*	--	DATE/TIME	Military time
DEPTH START	--	NUMBER	
DEPTH END	--	NUMBER	
DEPTH UNITS	25	TEXT	FEET, INCHES, METERS, etc.
ANALYTICAL METHOD	50	TEXT	
CAS NUMBER	25	TEXT	
ANALYTE	100	TEXT	
RESULT VALUE	--	NUMBER	For non-detected results, enter Reporting Limit ("U" must be present in Lab Qualifier field).
LAB QUALIFIER	10	TEXT	"U" for non-detected, others as defined by laboratory.
REPORTING LIMIT	--	NUMBER	
RESULT UNIT	25	TEXT	
DILUTION FACTOR	--	NUMBER	
REPORTABLE RESULT	--	YES/NO	DEFAULT TO YES
FILTERED?	--	YES/NO	
DATE ANALYZED	--	DATE/TIME	MM/DD/YY
TIME ANALYZED*	--	DATE/TIME	Military time
DATE EXTRACTED*	--	DATE/TIME	MM/DD/YY
LABORATORY NAME*	50	TEXT	

Notes:

- 1 This definition is for an "Excel-type" spreadsheet. Fields flagged with an "*" are optional and may be left blank if not available electronically from the laboratory.
- 2 Depth-related fields may be left blank for samples and matrices for which they are not applicable.



ARCADIS

Appendix B

Kalamazoo River Database
Data Dictionary

Appendix B
Kalamazoo River Database Data Dictionary
RI/FS Sample Identification Scheme

The sample identification scheme consists of a letter identifier followed by a five digit number:

Identifier	Location
K	Kalamazoo River
P	Portage Creek
A	Allied OU
W	Willow Blvd./ A-Site
H	King Highway Landfill OU
T	12th Street Landfill OU
G	Georgia-Pacific Kalamazoo Mill Property
S	Simpson Plainwell Paper Mill Property
X	Portage Paper Mill Property
F	Former King Mill Property
M	Former Monarch Mill Property
Q	Quality Control Samples (Lab Splits)
Z	King Street Storm Sewer

Location (Identifiers)	Sample Identification Series	Sample Type Identifier Sequence	Sample Matrix
Kalamazoo River & Portage Creek (K,P,Z)	10,000	10000-11999	Kalamazoo River/Portage Creek Floodplain Soils
		12000-13999	Ecological Assessment Soil Samples (TBSA)
		14000-15999	Reserved as additional IDs
		16000-17999	Geochronological dating/PCB deposition
		18000-18099	King Street Storm Sewer Soil Samples
		18100-18999	Sediment Samples
	20,000	19000-19100	King Street Storm Sewer Water Samples
		19101-19999	Reserved as additional IDs
		20000-22499	Sediment - Stratified Sampling (Marsh Sampling)
		22500-24999	Geostatistical Samples
		25000-27499	Exposed Former Impoundment Sediments
		27500-29999	Reserved as additional IDs
	30,000	30000-33999	Base Flow Samples (Surface Water)
		34000-37999	High Flow Event Samples (Surface Water)
	40,000	38000-39999	Reserved as additional IDs
		40000-41999	Fish Samples
		42000-43999	Turtle Samples
		44000-45999	Deer Mice Samples
		46000-49999	Reserved as additional IDs
		50000-	River Sediment Sampling
Mill Properties (G,S,X,F,M)	50,000	50000-50999	Former King Mill Soil Samples
		51000-51999	Former King Mill Water Samples
		52000-52999	Georgia Pacific Mill Soil Samples
		53000-53999	Georgia Pacific Mill Water Samples
		G#F###,G#P###	Georgia Pacific Mill Air Samples
		54000-55999	Portage Paper Mill
		56000-57999	Simpson Plainwell Paper Mill
		58000-59999	Reserved as additional IDs
Allied Paper, Inc. Operable Unit (A)	60,000	60000-62999	Residuals/Soils Characterization
		63000-63999	Sediment Samples
		64000-65999	Base Flow Samples - Surface Water
		66000-66499	Groundwater Samples
		66500-66999	Event Base Flow Samples - Surface Water
		67000-67999	Biota Samples - Fish
		68000-68999	Air Samples
		69000-69100	Clarifier Samples
		69101-69300	Geotechnical Samples
		69301-69999	Reserved as additional IDs

Appendix B
Kalamazoo River Database Data Dictionary
RI/FS Sample Identification Scheme

The sample identification scheme consists of a letter identifier followed by a five digit number:

Identifier	Location
K	Kalamazoo River
P	Portage Creek
A	Allied OU
W	Willow Blvd./ A-Site
H	King Highway Landfill OU
T	12th Street Landfill OU
G	Georgia-Pacific Kalamazoo Mill Property
S	Simpson Plainwell Paper Mill Property
X	Portage Paper Mill Property
F	Former King Mill Property
M	Former Monarch Mill Property
Q	Quality Control Samples (Lab Splits)
Z	King Street Storm Sewer

Location (Identifiers)	Sample Identification Series	Sample Type Identifier Sequence	Sample Matrix
Willow/A-Site Operable Unit (W)	70,000	70000-73999 74000-75999 76000-76999 77000-77999 78000-78999 79000-79499 79500-79999 W#F###,W#P###	Residuals/Soil Characterization Samples Groundwater Investigation Samples Surface Water Samples Reserved as additional IDs Sediment Samples Geotechnical Samples Reserved as additional IDs Air Samples
King Highway Landfill Operable Unit (H)	80,000	80000-83999 84000-85999 86000-86999 87000-87499 87500-87999 88000-89999 H#F###,H#P###	Residuals/Soils Characterization Samples Groundwater Investigation Samples Sediment Investigation Samples Surface Water Samples Geotechnical Samples Reserved as additional IDs Air Samples
12th Street Landfill Operable Unit (T)	90,000	90000-93999 94000-95999 96000-99999	Residuals/Soils Characterization Samples Groundwater Investigation Reserved as additional IDs

Appendix B
Kalamazoo River Database Data Dictionary
Field Parameters Surface Water and Ground Water Field Data

Field Name	Field Type	Field Width	Units	Field Description
Sample ID	Text	10		See Sample ID Table
pH	Numeric		Standard Units	pH
Air Temperture (C)	Numeric		degrees Celsius	Air Temperature
Water Temperture (C)	Numeric		degrees Celsius	Water Temperature
Specific Conductivity	Numeric		mS/cm	Specific Conductance
Dissolved Oxygen	Numeric		mg/L	Dissolved Oxygen
Turbidity	Numeric		NTU	Turbidity

Appendix B
Kalamazoo River Database Data Dictionary
Field Data Pertaining to all Sample Types

Field Name	Field Type	Field Width	Units	Field Description
Site	Text	60		Site name
Sample ID	Text	60		See Sample ID Table
BBLID	Text	50		BBL sample location ID - corresponds to locations and samples described in Technical Memoranda and other submittals to MDEQ. Many identifiers are site-specific to the OU or river area where samples were collected from. Common general identifiers include: MW - monitoring well SWP-# - Portage Creek surface water sample SWK-# - Kalamazoo River surface water sample TES-# - Former Trowbridge Impoundment exposed sediment sample OES-# - Former Otsego Impoundment exposed sediment sample PES-# - Former Plainwell Impoundment exposed sediment sample KF-# - Kalamazoo River floodplain soil sample OM-# - Ottawa Marsh soil/sediment sample PM-# - Pottawattomie Marsh soil/sediment sample FF-# Focused soil/sediment sample RRA# - Residential soil sample TBSA-# - Terrestrial biota sampling area sample KL-# - Kalamazoo River sediment sample AL-#, AL-3, AL-4 - Allegan City Impoundment geochronologic sample KPS-# - Geostatistical pilot study sediment sample KPT-# - Kalamazoo River sediment characterization sediment sample PPT-# - Portage Creek sediment characterization sediment sample
Location	Text	100		Location description
Project Number	Text	50		Kalamazoo project number - can also be used as a location identifier:
Operable Unit	Text	50		Operable unit at which sample is located: KZOO = Kalamazoo River PC = Portage Creek ALL = Allied OU WBAS = Willow Blvd./A-Site KING = King Highway Landfill OU 12TH = 12th Street Landfill OU GPKM = Georgia Pacific Kalamazoo Mill Property SPPM = Simpson Plainwell Paper Mill Property PPM = Portage Paper Mill Property FKM = Former King Mill Property FMM = Former Monarch Property KSS = King Street Storm Sewer

Appendix B
Kalamazoo River Database Data Dictionary
Field Data Pertaining to all Sample Types

Field Name	Field Type	Field Width	Units	Field Description
Sample Method	Text	50		Sampling method
Sample Matrix	Text	50		Matrix type of sample: AIR BIOTA BLANK FLOODPLAIN SOIL GROUNDWATER RESIDUAL SEDIMENT SOIL SURFACE WATER
Sample Fraction	Text	50		Sample fraction: CARCASS FILLET FILLET-SKIN-OFF FILLET-SKIN-ON MISSING (Note: these are whole-body and whole-body composite samples from Portage Creek and are corrected in the current database) MUSCLE TOTAL WHOLE BODY
Sample Description	Text	255		Sample description
Sample Date	Date			Date of sample preparation and submittal to the laboratory
Depth Top	Numeric			Depth to top of sample increment, where applicable
Depth Bottom	Numeric			Depth to bottom of sample increment, where applicable
Depth Units	Text	20		Units of Depth Top and Depth Bottom
Water Depth	Numeric		feet	Depth of water at sample location
Samplers	Text	20		Initials of individuals who performed the sampling
QC Performed	Text	50		QA/QC information. This field is used to identify duplicate samples. DUP(sample ID) = sample is a field duplicate of sample ID indicated in (). RINSE BLANK MS/MSD = Matrix Spike/Matrix Spike Duplicate
Comments	Text	255		Comments
Archived	Boolean			Has sample been archived waiting analysis?
Immunoassay	Boolean			Immunoassay result less/greater than 1 mg/kg?
Geochronology	Boolean			Geochronology analysis requested?
Bicarbonate	Boolean			Bicarbonate analysis requested?
Carbonate	Boolean			Carbonate analysis requested?

Appendix B
Kalamazoo River Database Data Dictionary
Field Data Pertaining to all Sample Types

Field Name	Field Type	Field Width	Units	Field Description
Chloride	Boolean			Chloride analysis requested?
Nitrate	Boolean			Nitrate analysis requested?
Sulfate	Boolean			Sulfate analysis requested?
Oil and Grease	Boolean			Oil and Grease analysis requested?
COD	Boolean			COD analysis requested?
TOC	Boolean			TOC analysis requested?
TSS	Boolean			TSS analysis requested?
Percent Solids	Boolean			Percent Solids analysis requested?
Lipids	Boolean			Percent Lipids analysis requested?
PCB Aroclors	Boolean			PCB Aroclors analysis requested?
PCB Congeners	Boolean			PCB Congeners analysis requested?
Pesticides	Boolean			Pesticides analysis requested?
Pesticides (Biota)	Boolean			Pesticides (Biota) analysis requested?
Dioxin/Furans	Boolean			Dioxan/Furans analysis requested?
Semivolatiles	Boolean			Semivolatiles analysis requested?
Volatiles	Boolean			Volatiles analysis requested?
Mercury	Boolean			Mercury analysis requested?
TAL Metals	Boolean			TAL metals analysis requested?
Particle Size	Boolean			Particle size analysis requested?

Appendix B
Kalamazoo River Database Data Dictionary
Biota Specific Field Data

Field Name	Field Type	Field Width	Units	Field Description
Sample ID	Text	10		See Sample ID Table (Note that for 1993 fish samples there is an additional character in the ID denoting the following:) F = denotes fillet sample R = denotes remaining carcass sample W = denotes whole-body sample C = denotes composite sample M = muscle sample
Location Name	Text	150		Location description
TBSA	Numeric			Terrestrial or Aquatic Biota Sampling Area Number - used to identify sample locations: For fish and turtle samples (ABSA #): 1 = Upstream of the City of Battle Creek, near I-94 2 = Morrow Lake 3 = Upstream of Portage Creek 4 = City of Kalamazoo near Mosel Avenue 5 = Between the Highway 131 bridge in Plainwell and Plainwell Dam 6 = Plainwell Dam to Otsego City Dam 7 = Upstream of Otsego Dam 8 = Upstream of Trowbridge Dam 9 = Lake Allegan 10 = Swan Creek Marsh 11 = Near New Richmond 12 = Portage Creek (Bryant Mill Pond) 13 = Near Saugatuck For mice and earthworm samples (TBSA #): 1 = Upstream of the Swan Creek confluence with Kalamazoo River 2 = Approximately 1 mile upstream of the Trowbridge Dam 3 = Near confluence of Schnable Creek with Kalamazoo River, upstream of the Trowbridge Dam 4 = Approximately 2 miles upstream of Schnable Creek confluence with the Kalamazoo River 5 = Upstream of the Schnable Creek confluence with Kalamazoo River 6 = Approximately 1 mile upstream of the Otsego Dam 7 = Immediately upstream of the Pine Creek confluence with the Kalamazoo River 8 = 1/4 mile downstream of the Highway 131 bridge 9 = 1/2 mile downstream of the Highway 131 bridge 10 = Behind the City of Plainwell Wastewater Treatment Plan 11 = Approximately 2.25 miles upstream of I-94 Bridge, near Wattles Park

Appendix B
Kalamazoo River Database Data Dictionary
Biota Specific Field Data

Field Name	Field Type	Field Width	Units	Field Description
Species	Text	20		Species
Gender	Text	7		Gender, where applicable
Abnormal	Boolean			Were physical abnormalities observed on the specimen?
Length	Numeric		cm	Length of sample (Note: average of individuals for composite samples)
Weight	Numeric		gm	Weight of sample (Note: average of individuals for composite samples)
Age	Numeric		yr	Age of specimen, where applicable
Tissue Prep	Text	15		Type of sample (see "Sample Fraction" field in FIELDINFO table)
Sample Type	Text	9		Sample type = DISCRETE or COMPOSITE
Composite Count	Numeric			Number of individuals in composite sample
BIOLIPID	Numeric		percent	Lipid content of sample
ALT_LIPIDS	Numeric			Artifact of historical laboratory reporting. Can be deleted.

Appendix B
Kalamazoo River Database Data Dictionary
Air Specific Field Data - This Table is Empty

Field Name	Field Type	Field Width	Units	Field Description
Sample ID	Text	50		See Sample ID Table
Date Measured	Date			Date measured
Wind Speed	Numeric		m/s	Wind speed
Wind Direction	Text	50	degrees	Wind direction
Solar Radiation	Numeric		Langley's-Ly	Solar radiation
Relative Humidity	Numeric		%	Relative humidity
Air Temperature	Numeric		°F	Air temperature

Appendix B
Kalamazoo River Database Data Dictionary
Groundwater Specific Field Data

Field Name	Field Type	Field Width	Units	Field Description
Sample ID	Text	10		See sample ID table
Well Number	Text	10		Location ID
Depth to Water	Numeric		feet	Depth to Groundwater
Water Table Elevation	Numeric		feet above NGVD	Water Table Elevation
Purge Volume	Numeric		gallons	Volume of Purge water

Appendix B
Kalamazoo River Database Data Dictionary
Soils/Residuals Specific Field Data

These data are from the Operable Units (OUs), where a single boring may contain both soil samples and residual samples.
These data are presented in the OU Technical Memoranda.

Field Name	Field Width	Field Type	Units	Field Description
Sample ID	10	Text		See Sample ID Table
Residual?		Boolean		Is sample residual?
Boring ID	15	Text		Boring Location ID
Boring Depth		Numeric	feet	Total boring depth
PID Head		Numeric	ppm	PID headspace

Appendix B
Kalamazoo River Database Data Dictionary
Sediment specific field data.

Contains sediment information for samples which are not part of the sediment characterization.
Core data for samples from the sediment characterization are stored in the PROBE table.

Field Name	Field Type	Field Width	Units	Field Description
Sample ID	Text	10		See Sample ID Table
Transect ID	Text	7		Transect ID number
Transect Location	Numeric			Location on transect
Frozen Core?	Boolean			Is sample frozen?
Sediment Penetration	Numeric		feet	Depth of sediment penetrated
Sediment Recovered	Numeric		feet	Amount of sediment recovered

Appendix B
Kalamazoo River Database Data Dictionary
Surface Water Sample Field Data

Field Name	Field Type	Field Width	Units	Field Description
Sample ID	Text	10		See Sample ID Table
Start Depth	Numeric		feet	Depth at start of sample
End Depth	Numeric		feet	Depth at end of sample
Discharge	Numeric		cfs	River flow, where applicable
River Width	Numeric		feet	River width, where applicable

Appendix B
Kalamazoo River Database Data Dictionary
Analytical Sample Results

Field Name	Field Type	Field Width	Field Description
Sample ID	Text	255	See Sample ID Table
Sample Fraction	Text	50	Sample fraction: CARCASS DISSOLVED FILLET FILLET-SKIN-OFF FILLET-SKIN-ON MISSING (Note: these have been corrected in the current database) MUSCLE SKIN-ON-FILLET TOTAL WHOLE BODY
Method Name	Text	100	Analysis performed
Analyte	Text	255	Analyte name
Lab Name	Text	100	Laboratory that analyzed sample
SDG Number	Text	50	Laboratory Sample Delivery Group containing sample
Lab Sample ID	Text	100	Laboratory-assigned ID
Method Number	Text	50	Analytical method number
CASNo	Text	50	CAS number of analyte
Results	Numeric		Analytical Results (concentration)
ConcUnits	Text	50	Units of concentration
Qualifier	Text	50	Analytical qualifier from laboratory:
Validation Qualifier	Text	50	Final analytical qualifier following QA/QA review and data validation See Analytical Qualifiers Table
Validated?	Boolean		Has sample been validated?
Checked by	Text	50	Not Used, can be deleted
Text Results	Text	100	Analytical result formatted as a text string (number in parentheses is detection level)

Appendix B
Kalamazoo River Database Data Dictionary
Organic Data Qualifiers

AD	Aroclor 1242 is being reported as the best Aroclor Match. The sample exhibits an altered PCB pattern.
AF	Aroclor 1254 is being reported as the best Aroclor Match. The sample exhibits an altered PCB pattern.
AG	Aroclor 1260 is being reported as the best Aroclor Match. The sample exhibits an altered PCB pattern.
DF	The Aroclor 1242 pattern exhibited in this sample has a diminished front end pattern compared to an Aroclor 1242 standard
U	The compound was analyzed for but not detected. The associated value is the compound quantitation limit.
J	The compound was positively identified; however, the associated numerical value is an estimated concentration only.
B	The compound has been found in the sample as well as its associated blank, its presence in the sample may be suspect.
N	The analysis indicates the presence of a compound for which there is presumptive evidence to make a tentative identification.
JN	The analysis indicates the presence of a compound for which there is presumptive evidence to make a tentative identification. The associated numerical value is an estimated concentration only.
E	The compound was quantitated above the calibration range.
D	Concentration is based on a diluted sample analysis.
UJ	The compound was not detected above the reported sample quantitation limit. However, the reported limit is approximate and may or may not represent the actual limit of quantitation.
R	The sample results are rejected.
PR	(PCDD/PCDF only). The reported concentration may be underestimated due to a poorly resolved GC peak.
P	The difference between the two columns was greater than 25%.
C	Results confirmed by GC/MS
h	mg/kg dry weight.
L	Reported result may be due to laboratory contamination.
Q	The reported concentrations and percent recoveries may be overestimated or underestimated due to quantitative interference.
X	Reported concentration exceeds the calibration range.
Y	(SVOC) - poorly resolved peak.

Appendix B
Kalamazoo River Database Data Dictionary

Organic Data Qualifiers

(PCB/Pesticides) - Peak response outside calibration range.

- Z The reported result is based on the combined instrument response from coeluting compounds.

INORGANIC DATA QUALIFIERS

Concentration (C) qualifiers:

- U The analyte was analyzed for but not detected. The associated value is the analyte instrument detection limit.
- B The reported value was obtained from a reading less than the contract required detection limit (CRDL) but greater than or equal to the instrument detection limit (IDL).

Quantitation (Q) qualifiers:

- E The reported value is estimated due to the presence of interference.
- M Duplicate injection precision not met.
- N Spiked sample recovery not within control limits.
- S Reported value was determined by the method of standard additions (MSA).
- W Post-digestion spike for Furnace-AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.
- * Duplicate analysis not within control limits.
- + Correlation coefficient for MSA is less than 0.995.

Validation qualifiers:

- J The analyte was positively identified; however, the associated numerical value is an estimated concentration only.
- UJ The analyte was not detected above the reported sample detection limit. However, the reported limit is approximate and may or may not represent the actual limit of detection.
- R The sample results are rejected.

Appendix B
Kalamazoo River Database Data Dictionary
Sample Locations

Location - Contains the X, Y, and Z coordinates for sample locations, where applicable.

Field Name	Field Type	Field Width	Description
BBLID	Text	50	Sample ID (see Sample ID table)
Northing	Numeric		Northing coordinate of sampling location, in feet, State Plane Coordinate System, 1983.
Easting	Numeric		Easting coordinate of sampling location, in feet, State Plane Coordinate System, 1983.
Elevation	Numeric		Elevation of sampling location, feet above sea level, NGVD, 1929.

Appendix B
Kalamazoo River Database Data Dictionary
Particle Size Data

Particle Size data for sediment and soil samples, including sieve analysis and hydrometer.

Field Name	Field Type	Field Width	Description
Sample ID	Text	255	Sample ID (see Sample ID table)
%SOLIDS	Numeric		Percent Solids
16%ILE	Numeric		16th percentile particle size (microns)
16%ILE_QUAL	Text	20	Laboratory qualifier for the 16th percentile particle size
50%ILE	Numeric		Median particle size (microns)
84%ILE	Numeric		84th percentile particle size (microns)
PFGRAVEL	Numeric		Percent finer than gravel
PF#10	Numeric		Percent finer than a #10 sieve
PF#40A	Numeric		Percent finer than a #40 sieve
PF#200	Numeric		Percent finer than a #200 sieve
PF5MIC	Numeric		Percent finer than 5 microns

Appendix B
Kalamazoo River Database Data Dictionary
Data Pertaining to 1993/1994 Sediment Characterization

(See Technical Memorandum 10)

Field Name	Field Type	Field Width	Units	Field Description
BBID	Text	25		BBL ID of core location (format TRANSECT + "-" + LOC_TRANS)
TRANSECT	Text	7		Transect ID number
LOC_TRANS	Numeric			Location on transect
RBANK_DIST	Numeric		feet	Distance from right bank
PROJ_NUM	Numeric			Kalamazoo project number
DATE_COL	Date			Date core was collected
TIME_COL	Text	4		Time sample was collected (format - hhmm)
OP_UNIT	Text	4		Operable unit at which sample is located: KZOO = Kalamazoo River PC = Portage Creek ALL = Allied OU WBAS = Willow Blvd./A-Site KING = King Highway Landfill OU 12TH = 12th Street Landfill OU GPKM = Georgia Pacific Kalamazoo Mill Property SPPM = Simpson Plainwell Paper Mill Property PPM = Portage Paper Mill Property FKM = Former King Mill Property FMM = Former Monarch Property KSS = King Street Storm Sewer
WTR_DPTH	Numeric		feet	Water depth at sample location
RIVER_WDTH	Numeric		feet	River width at transect location
RT_EDGE	Numeric		feet	Distance to right edge of water from sample location
VELOCITY	Numeric		fps	Velocity at sample location
SED_DEPTH	Numeric		feet	Sediment depth at sample location
RECOVERY	Numeric		feet	Sediment recovered
SED_PEN	Numeric		feet	Depth of sediment penetrated
TOP_TYPE	Text	6		Soil type of top four inches: COARSE or FINE
TOP_DESC	Text	76		Description of top four inches
CORE_TAKEN	Boolean			Was core taken?
DATE_FROZE	Date			Date core was frozen
CORE_DESC	Text	76		Notes on non-recoverable cores
CORE_TYPE	Text	6		1993/1994 sediment texture classification of core (coarse/fine)
FINAL_CLASS	Text	50		1997 sediment texture classification of core (coarse/fine)
CRB_RATING	Numeric			1997 sediment texture rating (from 1 to 5)

Appendix B
Kalamazoo River Database Data Dictionary
Data Pertaining to 1993/1994 Sediment Characterization

(See Technical Memorandum 10)

Field Name	Field Type	Field Width	Units	Field Description
TOP_CORE1	Numeric		feet	Depth of top of first core segment
TOP_CORE2	Numeric		feet	Depth of top of second core segment
TOP_CORE3	Numeric		feet	Depth of top of third core segment
TOP_CORE4	Numeric		feet	Depth of top of fourth core segment
TOP_CORE5	Numeric		feet	Depth of top of fifth core segment
TOP_CORE6	Numeric		feet	Depth of top of sixth core segment
TOP_CORE7	Numeric		feet	Depth of top of seventh core segment
BOT_CORE1	Numeric		feet	Depth of bottom of first core segment
BOT_CORE2	Numeric		feet	Depth of bottom of second core segment
BOT_CORE3	Numeric		feet	Depth of bottom of third core segment
BOT_CORE4	Numeric		feet	Depth of bottom of fourth core segment
BOT_CORE5	Numeric		feet	Depth of bottom of fifth core segment
BOT_CORE6	Numeric		feet	Depth of bottom of sixth core segment
BOT_CORE7	Numeric		feet	Depth of bottom of seventh core segment
CORE1_DESC	Text	57		Description of first core segment
CORE2_DESC	Text	57		Description of second core segment
CORE3_DESC	Text	57		Description of third core segment
CORE4_DESC	Text	57		Description of fourth core segment
CORE5_DESC	Text	57		Description of fifth core segment
CORE6_DESC	Text	57		Description of sixth core segment
CORE7_DESC	Text	57		Description of seventh core segment
DATE_ENTER	Date			Not used
DATE_SYR	Date			Not used
DATE_PRINT	Date			Not used
DATE_VALID	Date			Not used

Appendix B
Kalamazoo River Database Data Dictionary
Inventory of Water Wells by River Reach

This table was a working table during the development of Technical Memorandum 13 (see Technical Memorandum 13).

Field Name	Field Type	Field Width	Description	Examples
REACH	Numeric		River Segment	1 Portage Creek - Cork Street to the Kalamazoo River 2 Morrow Dam to confluence with Portage Creek 3 Portage Creek to Main Street, Plainwell 4 Main Street Plainwell to Plainwell Dam 5 Plainwell Dam to Otsego City Dam 6 Otsego City Dam to Otsego Dam 7 Otsego Dam to Trowbridge Dam 8 Trowbridge Dam to Allegan City Dam 9 Allegan City Dam to Allegan Dam 10 Allegan Dam to Lake Michigan
WELL_ID	Numeric		Well ID	Same as WELL_ID in "WELLCOOR" Table
NEW_ID	Text	10	4-Digit ID Code	
UNPLOTTED	Boolean		True or False	Field was used during the water well inventory.

Appendix B
Kalamazoo River Database Data Dictionary
Transects

Data and calculations from the 1993/1994 RI sediment characterization study in the Kalamazoo River between Morrow Lake and Swan Creek Marsh, and Portage Creek between Alcott Street and the Kalamazoo River.
(See Technical Memorandum 10). Integrates all surveyed points and probing points.

Field Name	Field Type	Characters	Units	Description	Examples
BBID	Text	50		Location ID	Denotes transect number and then position along the transect. "X" denotes survey point only. KPT### = Kalamazoo River Transect core location ID PPT### = Portage Creek Transect core location ID KPT###-X# = Kalamazoo River Transect survey location ID PPT###-X# = Portage Creek Transect survey location ID
TRANSECT	Text	50		Transect	KPT## = Kalamazoo River Transect PPT## = Portage Creek Transect
TRANSID	Numeric			Transect Location	Location of point along the transect
TRANSID_DESCRIPTION	Text	100		Location Description	Combination of information in the first three fields. TRANSID-"SURV" or "SMPL"-BBID, where "SURV" denotes a survey-only point and "SMPL" denotes a probing location.
DIST_BETWEEN_PTS_FT	Numeric		feet	Distance between points (feet)	
CUM_DISTANCE_FT	Numeric		feet	Cumulative distance (feet)	For graphing purposes. Represents X-axis of the entire surveyed cross-section.
TRANS_LOC	Numeric			Sample Location Along Transect	Sequentially numbered probing locations only.
SOIL_TYPE	Text	50		Sediment Texture Classification	FINE or COARSE
REACH	Text	10		River Reach	A1 = Morrow Dam to confluence with Portage Creek A2 = Portage Creek to Main Street, Plainwell B = Main Street Plainwell to Plainwell Dam C = Plainwell Dam to Otsego City Dam D = Otsego City Dam to Otsego Dam E = Otsego Dam to Trowbridge Dam F = Trowbridge Dam to the Allegan City Line G = Allegan City Line to Allegan City Dam H = Lake Allegan I = Allegan Dam to Lake Michigan P = Portage Creek
WATER_WIDTH_FT	Numeric		feet	Channel Width at Transect (feet)	From edge of water right bank to edge of water left bank.

Appendix B
Kalamazoo River Database Data Dictionary
Transects

Data and calculations from the 1993/1994 RI sediment characterization study in the Kalamazoo River between Morrow Lake and Swan Creek Marsh, and Portage Creek between Alcott Street and the Kalamazoo River.
(See Technical Memorandum 10). Integrates all surveyed points and probing points.

Field Name	Field Type	Characters	Units	Description	Examples
SED_DEPTH_FT	Numeric		feet	Sediment Depth (feet)	Total depth of sediment probed
NO_LOCS_PER_TRANSECT	Numeric			Number of core locations along the transect	
REACH_LENGTH_FT	Numeric		miles	Length of reach (miles)	Total length of "REACH"
TRANSECTS_PER_REACH	Numeric			Transect per reach	Number of transects within "REACH"
LENGTH_PER_CORE_FT	Numeric		feet	Length represented by transect (feet)	Approximately the length of the reach divided by the number of transects within the reach
WIDTH_PER_CORE_FT	Numeric		feet	Width represented by each core (feet)	Channel width at a transect divided by the number of cores in the transect
ACRES_PER_CORE	Numeric		acres	Acres per core for a transect	The length represented by a transect times the width of the channel at the transect, converted to acres, divided by the number of cores along the transect.
CUBIC_YDS_SED_PER_CORE	Numeric		cubic yards	Cubic yards of sediment per core	Calculated using the surface area per core times the depth of the probed sediment. Represents total sediment volumes, not PCB-containing sediment volumes.

Appendix B
Kalamazoo River Database Data Dictionary
State Plane Coordinates of Water Wells in the Water Well Inventory

(Technical Memorandum 13)

Field Name	Field Type	Characters	Description
WELL_ID	Numeric		Water Well Inventory ID. Same as WELL_ID in Reach Table.
EASTING	Numeric		Easting coordinate, State Plane coordinate system, NAD 1983
NORTHING	Numeric		Northing coordinate, State Plane coordinate system, NAD 1983

Appendix B
Kalamazoo River Database Data Dictionary
Surveyed Elevation Data for Operable Unit Wells

Elevations in feet above sea level, NGVD, 1929.
Data used to calculate groundwater elevations.

Field Name	Field Type	Field Width	Description	Examples
WELL_NO	Text	10	Well ID	Well locations are identified in OU Technical Memoranda. Same as "Well Number" in the "InfoGW" Table.
OP_UNIT	Text	4	Operable Unit	WBAS - Willow Boulevard/A-Site OU KING - King Highway Landfill OU 12TH - 12th Street Landfill OU ALL - Allied Paper, Inc. OU
TOP_2CASE	Numeric		Elevation of 2-inch casing	
TOP_4CASE	Numeric		Elevation of 4-inch casing	
TOP_CAP	Numeric		Elevation of Well Cap	

Appendix B
Kalamazoo River Database Data Dictionary
Remediated Locations

Look-up table of the locations and associated sediment samples where sediment has been removed subsequent to sample collection.

Field Name	Field Type	Field Width	Description
Sample ID	Text	60	Sample ID (see Sample ID table)
BBLID	Text	50	BBL Sample Location ID (see FIELDINFO Table)

Appendix B
Kalamazoo River Database Data Dictionary
Confirmation Samples

Samples collected during or after remedial activities were performed. These samples were not collected as part of the Kalamazoo River or Operable Unit Remedial Investigations and may not have met the same rigorous sampling, analytical, or QA/QC requirements as the rest of the RI data.

Field Name	Field Type	Field Width	Description	Examples
ID	AutoNumber		Number Assigned by the order in which samples were entered into table	
Source	Text	50	Collecting Agency/Company	BBL MDEQ = MDEQ (Appendix F of the Removal Action Summary for the Willow Boulevard/A-Site Operable Unit, BBL,2000) USEPA (Appendix B-2 of the Allied Paper/Portage Creek/Kalamazoo River Superfund Site Final Report, Weston,2000)
Lab Used	Text	50	Analytical Laboratory Used	KAR = KAR Laboratories, Inc. NEA = Northeast Analytical Inc
Location	Text	50	Location Identifier	
Date	Date/Time		Date sample was collected	
Northing	Numeric		Northing (NAD 1983 feet)	
Easting	Numeric		Easting (NAD 1983 feet)	
Total PCB (mg/kg)	Numeric		Total PCB (mg/kg)	
Total PCB Qualifier	Text	50	Total PCB Qualifier	See Qualifier Worksheet
Re Excavated?	Text	50	Used to denote samples which were re-excavated	Yes = area was excavated after the sample was collected Blank = area was not excavated after sample was collected
Percent Solids	Numeric		Percent Solids	
Aroclor 1016 (mg/kg)	Numeric		Aroclor 1016 (mg/kg)	
Aroclor 1016 Qualifier	Text	50	Aroclor 1016 Qualifier	
Aroclor 1221 (mg/kg)	Numeric		Aroclor 1221 (mg/kg)	
Aroclor 1221 Qualifier	Text	50	Aroclor 1221 Qualifier	
Aroclor 1232 (mg/kg)	Numeric		Aroclor 1232 (mg/kg)	
Aroclor 1232 Qualifier	Text	50	Aroclor 1232 Qualifier	
Aroclor 1242 (mg/kg)	Numeric		Aroclor 1242 (mg/kg)	
Aroclor 1242 Qualifier	Text	50	Aroclor 1242 Qualifier	
Aroclor 1248 (mg/kg)	Numeric		Aroclor 1248 (mg/kg)	
Aroclor 1248 Qualifier	Text	50	Aroclor 1248 Qualifier	
Aroclor 1254 (mg/kg)	Numeric		Aroclor 1254 (mg/kg)	
Aroclor 1254 Qualifier	Text	50	Aroclor 1254 Qualifier	
Aroclor 1260 (mg/kg)	Numeric		Aroclor 1260 (mg/kg)	
Aroclor 1260 Qualifier	Text	50	Aroclor 1260 Qualifier	

Appendix B
Kalamazoo River Database Data Dictionary
Geotechnical properties

Field Name	Field Type	Field Width	Units	Field Description
Sample ID	Text	50		
Liquid Limit	Numeric		%	Atterberg Liquid Limit
Plastic Limit	Numeric		%	Atterberg Plastic Limit
Plastic Index	Text	50		Atterberg Plastic Index
Moisture Content	Numeric		%	Moisture content (ratio of weight of water to weight of solids)
Bulk Density	Numeric		g/cm3	Bulk density (weight of dry soil in a unit volume).
Particle Density	Numeric		g/cm3	Particle Density
Wet Weight	Numeric		g	Wet Weight of sample
Total Volume	Numeric		cm3	Total volume of sample
Wet Density	Numeric		g/cm3	Wet Density (wet weight per unit volume)
Porosity	Numeric		%	Porosity (volume of void per unit volume)
Void Ratio	Numeric			Void ratio (ratio of volume of voids in the sample to the volume of the solid component)

Appendix B
Kalamazoo River Database Data Dictionary
Survey Locations for Erosion Pin Placement Study

Field Name	Field Type	Field Width	Units	Field Description
Location ID	Text	50		Survey Location
Northing	Numeric		feet	NAD 83 Northing
Easting	Numeric		feet	NAD 83 Easting
Elevation	Numeric		feet	NGVD 88 Elevation
Transect	Text	50		Sampling Transect
Side	Text	50		Side of River
Location #	Text	50		Location Along Transect
Date	Date			Date of Survey

Appendix B
Kalamazoo River Database Data Dictionary
Survey Locations for Erosion Pin Placement Study

Field Name	Field Type	Field Width	Units	Field Description
SID	Numeric			Survey ID Number
Transect	Text	50		Survey Transect
Position	Numeric			Position Number on Transect
Northing	Numeric		feet	NAD 83 Northing
Easting	Numeric		feet	NAD 83 Easting
Elevation	Numeric		feet	NGVD 88 Elevation